



# SYMBOL RFS 6000

## WIRELESS SERVICES CONTROLLER

ENABLING A SECURE AND RELIABLE WIRELESS ENTERPRISE FOR MEDIUM TO LARGE DEPLOYMENTS

### WIRELESS SERVICES CONTROLLER AND VOICE COMMUNICATIONS PLATFORM

The RFS 6000 Wireless Services Controller from Zebra enables the wireless enterprise by offering an integrated WLAN communication platform that delivers secure and reliable voice, video and data applications. Designed on the innovative and modular Wi-NG operating system, the RFS 6000 provides wired and wireless networking services, multiple locationing technologies such as Wi-Fi and RFID\*; resiliency via 3G wireless broadband backhaul; and high performance with 802.11n networks. The enterprise class RFS 6000 delivers the best in class performance, security, scalability and manageability required to meet the needs of demanding mission critical business applications.

### COST-EFFECTIVE CENTRALIZED MANAGEMENT & TROUBLESHOOTING

Based on Zebra's landmark Wireless Next Generation (Wi-NG) operating system, the RFS 6000 provides the tools you need to simplify and minimize the costs associated with real-time management of mobility solutions. The Wi-NG architecture provides unified management of network hardware, software configuration, and network policies, complete with built-in process monitors and troubleshooting tools for all the Access Points that it administers policy configurations for.

### RAISING THE BAR ON ENTERPRISE CLASS PERFORMANCE AND NETWORK RESILIENCY

The RFS 6000 offers a multicore, multithreaded Wi-NG architecture capable of supporting 2,000 to mobile devices and up to 256 802.11 a/b/g/n adaptive access points per switch/controller. The result is an architecture that is purpose-built to deliver high availability — and scalability. In addition, a user accessible ExpressCard™ Slot supports 3G broadband cards for a redundant wireless WAN backhaul connection, providing a truly self-sustainable wireless enterprise.

### GAP-FREE SECURITY FOR THE WIRELESS ENTERPRISE

Comprehensive network security features keep wireless transmissions secure and provide compliance for HIPAA and PCI. The RFS 6000 provides gap-free security for the WLAN network, following a tiered approach to protect and secure data at every point in the network, wired or wireless. This complete solution includes a wired/wireless firewall, a built-in wireless intrusion protection system (IPS), an integrated IPSec VPN gateway, AAA Radius Server and secure guest access with a captive web portal, reducing the need to purchase and manage additional infrastructure. Additional security features include MACbased authentication, 802.11w\* to secure management frames, NAC support, anomaly analysis and more.

### ENABLING TOLL-QUALITY VOICE FOR THE WIRELESS ENTERPRISE

Support for VoWLAN provides cost-effective voice services throughout the wireless enterprise, enabling push-to-talk and more for employees inside the four walls as well as outside. The rich feature set provides granular control over the many wireless networking functions required to deliver high performance persistent clear connections with

### FEATURES

#### Wi-NG Operating System — delivering a unified voice, data and RF management platform

Improve business process flow with one platform for wireless voice, video, data and multiple RF technologies — such as RFID\*, Wi-Fi (including 802.11n) and future 4G technologies; rich enterprise-class functionality includes seamless roaming across L2/L3 deployments, resilient failover capabilities, comprehensive security, toll-quality voice and other value-added services, such as secure guest access and multi-RF locationing\*

#### Role-based wired/wireless firewall

Comprehensively secures and protects the wired and wireless network against attacks and unauthorized access at Layer 2 and Layer 3 with stateful inspection; ability to create identity and location-based policies provides granular control of network access

#### Adaptive AP: extending the enterprise

Enables centralized management of adaptive access points at remote sites including automatic firmware upgrades; provides site survivability for remote locations with 802.11a/b/g/n networks for unparalleled resiliency with full WING 5 capabilities available at the edge of the network, even in site survivable mode

#### SMART RF Management

toll-quality voice. Quality of Service (QoS) ensures superior performance for voice and video services. WMM Admission Control, including TSPEC, SIP Call Admission Control, and 802.11k\* radio resource management, ensures dedicated bandwidth for voice calls as well as better control over active voice calls for a variety of VoIP handsets.

### **ADAPTIVE AP FOR INCREASED NETWORK FLEXIBILITY — AND SITE SURVIVABILITY**

The RFS 6000 simplifies and reduces the cost of extending mobility to remote and branch offices as well as telecommuters. Zebra's Independent Mesh Access Points can be deployed at remote locations yet centrally managed in the Network Operations Center (NOC) through the RFS 6000 (single switch or a cluster for scalability). Remote Site Survivability (RSS) mesh access points deliver secure uninterrupted wireless service — providing unparalleled resiliency that survives a WAN link outage with the distributed intelligence of WiNG 5 that delivers controller-like services at the edge.

### **PUT YOUR RF ON AUTOPILOT**

The WiNG architecture delivers SMART RF Management, which provides the dynamic RF tuning required for optimal network performance. This feature takes self-healing to the next level, dramatically reducing network monitoring IT costs by enabling the WLAN to intelligently adapt to the ever-changing RF environment. The ability to dynamically adjust the power and channels automatically eliminates the gaps in coverage that occur when an AP fails, or has a faulty antenna or there is a change in your environment — all without any physical intervention. And adjustments are completely transparent — there is no impact on voice calls and data sessions in progress — protecting the quality of service and the user experience to ensure user productivity.

### **MAXIMIZE BENEFITS — AND MINIMIZE COSTS**

All the enterprise class services such as security, voice, performance and resiliency are built into the Wi-NG architecture — the innovative and modular operating system (OS) for the RFS 6000. The RFS6000 includes a full-function DHCP server, AAA Server, POE/L2 Switch, VPN gateway. Captive Portal for Guest Access and a Wired/Wireless Firewall as part of the base OS image - giving users a highly secure multi-function solution,, simplifying the network deployment and reducing opex and capex. These comprehensive services come at no additional cost and are packaged together to make mobility work — even better.

### **END-TO-END SUPPORT**

As an industry leader in mobility, Zebra offers the experience gained from deploying mobility solutions all over the globe in many of the world's largest enterprises. Leverage this expertise through Zebra Enterprise Mobility Services, which provides the comprehensive support programs you need to deploy and maintain your RFS 6000 at peak performance. Zebra recommends protecting your investment with 'Service from the Start Advance Exchange Support', a multi-year program that provides the next-business-day device replacement , technical software support and software downloads you need to keep your business running smoothly and productively. This service also includes ' Comprehensive Coverage', which covers normal wear and tear, as well as internal and external components damaged through accidental breakage — significantly reducing your unforeseen repair expenses.

\*\*Available in WiNG 5 only currently

For more information, visit us on the web at [www.zebra.com/rfs6000](http://www.zebra.com/rfs6000) or access our global contact directory at [www.zebra.com/contact](http://www.zebra.com/contact)

## **RFS 6000 network architecture**

Enables the WLAN to automatically and intelligently adapt to changes in the RF environment to eliminate unforeseen gaps in coverage

### **Wireless Intrusion Prevention System**

The built-in WIPS system provides defense against over-the-air attacks by leveraging the band-unlocked sensing capabilities of 802.11n APs

### **Secure Guest Access (Hotspot)**

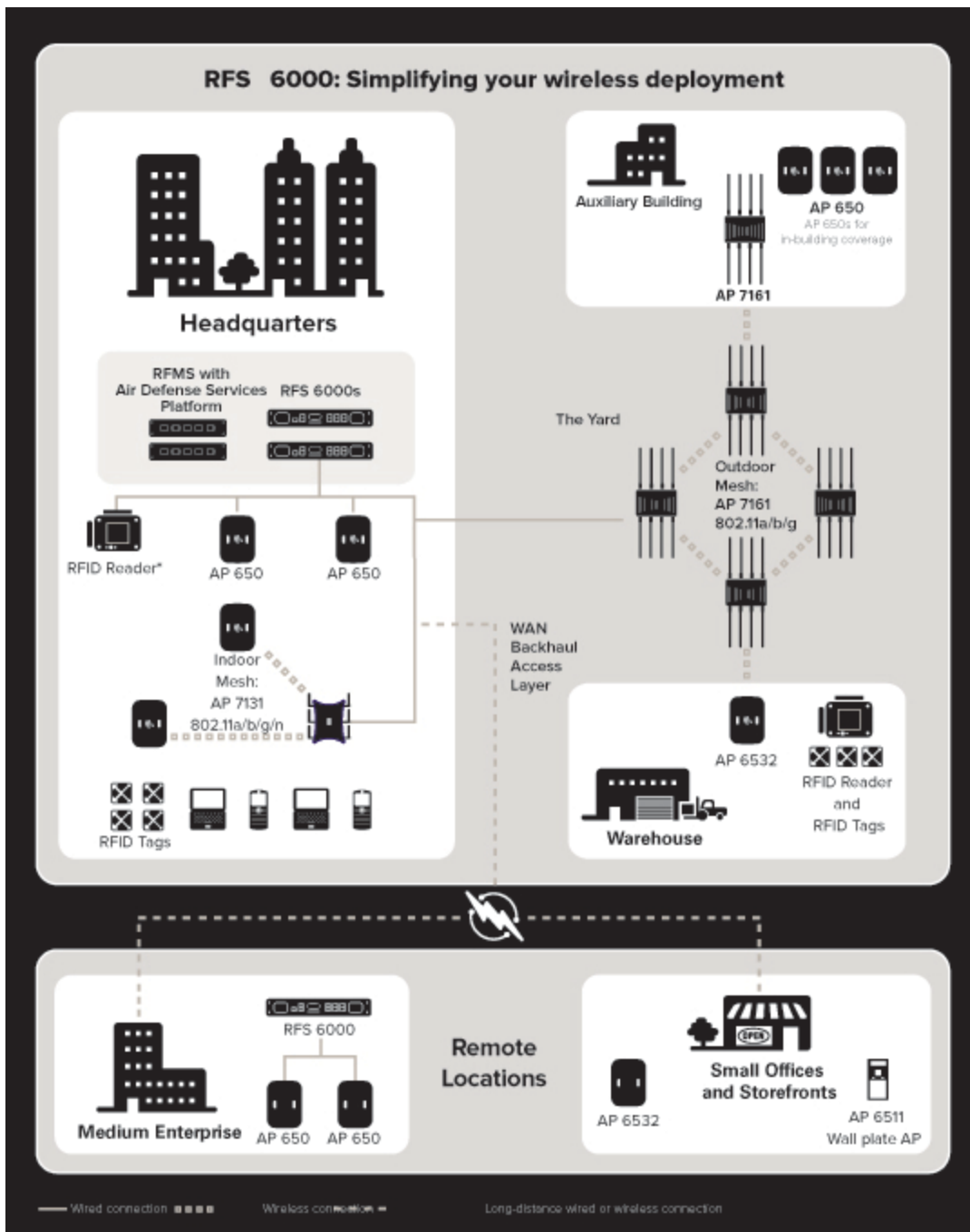
Provides secure guest access for Wired\*, and Wireless clients. built-in captive portal, customizable login/ welcome pages, URL redirection for user login, Usage based charging, Dynamic VLAN assignment of clients, DNS white list, GRE tunneling of traffic to central site\*, API support\* for interoperability with custom web portals, support for external authentication and billing systems

### **Real Time Locationing System (RTLS)\***

Provides rich locationing services to enable real-time enterprise asset-tracking through support for 802.11, RFID and third party locationing solutions — including industry leaders AeroScout, and Ekahau. Standards-based support for: EPC Global ALE interface for processing and filtering data from all active and passive tags; and EPC Global LLRP interface for passive RFID tag support

### **Clustering and failover features**

Supports multiple levels of redundancy and failover capabilities to ensure high availability networks; provides a single virtual IP\* ( per VLAN) for the cluster for use as default gateway by mobile devices/ wired infrastructure, onboard DHCP/AAA server synchronized failover;



multiplatform license sharing enables deployment of cost-effective networks

### 3G Wireless for WAN Backhaul

Support for 3G wireless cards to backhaul WAN traffic for rapid deployments or as a secondary WAN when the primary WAN Link fails

### Enhanced End-to-End Quality of Service (QoS)

Enhances voice and video capabilities; prioritizes network traffic to minimize latency and provide optimal quality of experience; SIP Call Admission Control and Wi-Fi Multimedia Extensions (WMM-Power Save) enhances multimedia application support and improves battery life and capacity; network optimization through granular bandwidth contracts based on bandwidth utilization network load and number of users for different applications being used, in different locations; TSPEC Admission Control ensures ample bandwidth and a superior user experience for VoIP calls

### True mobility

Virtual AP provides better control of broadcast traffic and enables multiple mobile and wireless applications with quality of service when network is congested; Pre-emptive Roaming ensures Zebra mobile devices roam before signal quality degrades; Power Save Protocol optimizes battery life

The RFS 6000 offers the comprehensive functionality necessary to extend wireless voice, video and data access inside medium to large enterprises — as well as to remote locations such as branch offices.

## RFS 6000 SPECIFICATIONS

### PACKET FORWARDING

802.1D-1999 Ethernet bridging; 802.11-802.3 bridging; 802.1Q VLAN tagging and trunking; proxy ARP; IP packet steering-redirection

### WIRELESS NETWORKING

Wireless LAN Supports 32 WLANs; multi-ESS/BSSID traffic segmentation; VLAN

### REAL TIME LOCATIONING SYSTEM (RTLTS)\*

RSSI based triangulation for Wi-Fi assets

Tags supported Ekahau, Aer Scout

RFID support Compliant with LLRP protocol. Built-in support for the following

### RFS 6000 Part Numbers:

- RFS-6010-100R0-WR:** Zero Port Wireless Switch
- RFS-6010-10010-WR:** 8 Port Wireless Switch
- RFS-6010-10030-WR:** 24 Port Wireless Switch
- RFS-6010-10060-WR:** 48 Port Wireless Switch
- RFS-6010-UC-08-WWR:**

to ESSID mapping; auto assignment of VLANs (on RADIUS authentication); power save protocol polling; pre-emptive roaming; VLAN Loadbalancing and dynamic VLAN adjustment; IGMP Snooping

Zebra RFID readers: fixed (XR440, XR450, XR480; mobile (RD5000) and handheld (MC9090-G RFID)

8 Port RFS 6000 Series Upgrade Certificate  
**RFS-6010-ADSEC-LIC:**  
 RFS 6000 License for Advanced Security  
**RFS-6010-ADWIP-LIC\*\*:**  
 Advanced Wireless Intrusion Protection License for RFS6000  
**RFS-6010-ADP-128:**  
 RFS 6000 Licenses for 128 Adaptive Access Points  
**RFS-6010-ADP-16:**  
 RFS 6000 Licenses for 16 Adaptive Access Points  
**RFS-6010-ADP-256:**  
 RFS 6000 Licenses for 256 Adaptive Access Points  
**RFS-6010-APPL-LIC\*:**  
 RFS 6000 License for the Location Application License  
**RFS-3G-BKHL-LIC\*:**  
 RFS 6000 License for Wireless WAN support

## OPTIMIZED WIRELESS QOS

<b>RF priority</b>	Optimizes network performance by preventing flooding of the broadcast domain
<b>Wi-Fi Multimedia extensions</b>	WMM-power save with TSPEC Admission Control; WMM U-APSD
<b>IGMP snooping</b>	Optimizes network performance by preventing flooding of the broadcast domain
<b>SIP Call Admission Control</b>	Controls the number of active SIP sessions initiated by a wireless VoIP phone
<b>802.11k*</b>	Provides radio resource management to improve client throughput (11k client required)
<b>Classification and marking</b>	Layer 1-4 packet classification; 802.1p VLAN priority; DiffServ/TOS

## SYSTEM RESILIENCY AND REDUNDANCY

**Active:Standby; Active:Active and N+1 redundancy with access port and MU load balancing; Critical resource monitoring**

**Virtual IP\*:** Single virtual IP (per VLAN) for a switch/contoller cluster to use as the default gateway by mobile devices or wired infrastructure. Seamless fail-over of associated services e.g. DHCP Server.

**SMART RF:**Network optimization to ensure user quality of experience at all times by dynamic adjustments to channel and power (on detection of RF interference or loss of RF coverage/neighbor recovery).

Dual Firmware bank supports Image Failover capability

## SYSTEM EXTENSIBILITY

ExpressCard™ Slot: Driver support for 3G wireless cards for WAN backhaul

- **AT&T (NALA) – HYPERLINK “ <http://www.wireless.att.com/businesscenter/sierra-wireless-aircard-890/index.jsp?skuld=sku9557600025>” Sierra Wireless AirCard® 890, Option GT Ultra Express**
- **Verizon (NALA) – V770 Express Card**
- **Sprint (NALA) - Sprint Novatel Merlin C777 Express card**
- **Rogers Wireless (Canada) – Sierra Wireless AirCard® 503**
- **Vodaphone (EMEA) – Novatel Merlin XU870**
- **Vodaphone (EMEA) – Vodaphone E3730 3G Expresscard**
- **Telstra (Australia) – Sierra Wireless AirCard® 503, Telstra Turbo 7 series Expresscard (Aircard 880E)**

**Bandwidth management** Congestion control per WLAN; per user based on user count or bandwidth utilization per AP; dynamic load balancing; bandwidth provisioning via AAA server

**Layer 2 or Layer 3 deployment of dependent and Adaptive access points**

**Layer 3 Mobility (Inter-Subnet Roaming)**

**IPv6 client support**

**Dependent Access Ports** Supports 1-48 802.11a/b/g AP 300 or 256\*\* 802.11a/b/g/n AP 650 / AP 621 access points for L2 or L3 deployment per RFS 6000 Wireless Services Controller; Legacy support\*: AP 100 for L2 deployments only

**Adaptive AP** Supports adoption of 256 adaptive access points per RFS 6000 Wireless Services Controller; Legacy support\*: AP 4131 port conversion for L2 deployments only

**Power-over-Ethernet** Integrated; up to 29.7 watts per Ethernet port, up to a maximum of 180 watts for simultaneous operation

**Mesh Capability** Single hop mesh\*\* supported on the 802.11n Dependent and Adaptive/Independent Access Points. WING v4.x supports multi-hop mesh on AP5131/AP7131

Radio frequency automatic channel select (ACS); Transmit power control management (TPC); Country code-based RF configuration; 802.11b, 802.11g 802.11a, and 802.11n

## NETWORK SECURITY

Role-based wired/wireless firewall (L2-L7) with stateful inspection for wired and wireless traffic; Active firewall sessions — 100,000 per RFS 6000 Wireless Services Controller; protects against IP Spoofing and ARP Cache Poisoning

**Access Control Lists (ACLs)** L2/L3/L4 ACLs

**Wireless IDS/IPS** Multi-mode rogue AP detection, Rogue AP Containment, 802.11n

Rogue Detection, Ad-Hoc Network Detection, Denial of Service protection against wireless attacks, client blacklisting, excessive authentication/ association; excessive probes; excessive disassociation/ deauthentication; excessive decryption errors; excessive authentication failures; excessive 802.11 replay; excessive crypto IV failures (TKIP/ CCMP replay); Suspicious AP, Authorized device in ad-hoc mode, unauthorized AP using authorized SSID, EAP Flood, Fake AP Flood, ID theft, ad-hoc advertising Authorized SSID

- **General Use – Novatel Merlin XU870, Option GE 0302, Sierra Wireless AirCard® 504**

#### PCI-X interface

### PHYSICAL CHARACTERISTICS

<b>Form factor</b>	1U Rack Mount
<b>Dimensions</b>	1.75 in. H x 17.32 in. W x 15.39 in. D 44.45 mm H x 440 mm W x 390.8 mm D
<b>Weight</b>	14 lbs./6.35 kg
<b>Physical interfaces</b>	1x Uplink Port -10/100/1000 Cu/ Gigabit SFP interface 8x 10/100/1000 Cu Ethernet Ports with 29.7 Watts PoE, 802.3af and 802.3at Draft 1x 10/100 Management Interface ( OOB port) 1x USB 2.0 Host 1x ExpressCard™ Slot (in USB mode) 1X PCI-X Interface 1x Serial Port (RJ45 style)
<b>MTBF</b>	>65,000 Hours

### USER ENVIRONMENT

<b>Operating temperature</b>	32° F to 104° F /0° C to 40° C
<b>Storage temperature</b>	-40° F to 158° F/-40° C to 70° C
<b>Operating humidity</b>	5% to 85% (w/o condensation)
<b>Storage humidity</b>	5% to 85% (w/o condensation)
<b>Heat dissipation</b>	665 BTU per hour
<b>Max Operating Altitude</b>	3000m

### POWER REQUIREMENTS

<b>AC input voltage</b>	100-240 VAC 50/60Hz
<b>Max Power Consumption</b>	300W

### REGULATORY

<b>Product safety</b>	UL / cUL 60950-1, IEC / EN60950-1
<b>EMC compliance</b>	FCC (USA), Industry Canada, CE ( Europe), VCCI (Japan), C-Tick ( Australia/New Zealand)

### RECOMMENDED ENTERPRISE MOBILITY SERVICES

<b>Customer Services</b>	Service from the Start Advance
--------------------------	--------------------------------

<b>Geofencing</b>	Add location of users as a parameter that defines access control to the network
<b>WIPS sensor conversion</b>	Supported on all dependent and Independent Access Points
<b>Anomaly Analysis</b>	Source Media Access Control ( MAC) = Dest MAC; Illegal frame sizes; Source MAC is multicast; TKIP countermeasures; all zero addresses
<b>Authentication</b>	Access Control Lists (ACLs); pre-shared keys (PSK); 802.1x/ EAP—t ransport layer security ( TLS), tunneled transport layer security (TTLS), protected EAP ( PEAP); Kerberos Integrated AAA/ RADIUS Server with native support for EAP-TTLS, EAP-PEAP ( includes a built in user name/ password database; supports LDAP), and EAP-SIM
<b>Transport encryption</b>	WEP 40/128 (RC4), KeyGuard, WPA—TKIP, WPA2-CCMP (AES), WPA2-TKIP
<b>802.11w*</b>	Provides origin authentication, integrity, confidentiality and replay protection of management frames for Zebra's AP 300 access point
<b>IPSec VPN gateway</b>	Supports DES, 3DES and AES-128 and AES-256 encryption, with site-to-site and client-to-site VPN capabilities; supports 1,024 concurrent IPSEC tunnels per switch
<b>Secure guest access (Hotspot provisioning)</b>	Provides secure guest access for wired* and wireless clients. built-in captive portal, customizable login/ welcome pages, URL redirection for user login, usagebased charging, dynamic VLAN assignment of clients, DNS white list, GRE tunneling of traffic to

central site, API support for interoperability with custom web portals support for external authentication and billing systems

Exchange Support

---

<b>Wireless RADIUS Support (Standard and Zebra Vendor Specific Attributes)</b>	User Based VLANs (Standard) MAC Based Authentication (Standard) User Based QoS (Zebra VSA) Location Based Authentication (Zebra VSA) Allowed ESSIDs (Zebra VSA)
--	---

---

NAC support with third party systems from Microsoft, Symantec and Bradford

---

## MANAGEMENT

---

Command line interface (serial, telnet, SSH); secure Web-based GUI (SSL) for the wireless switch and the cluster; SNMP v1/v2/v3; SNMP traps—40+ user configurable options; Syslog; Firmware, Config upgrade via TFTP, FTP & SFTP (clients); simple network time protocol (SNTP); text-based switch configuration files; DHCP (client/server/relay), switch auto-configuration and firmware updates with DHCP options; multiple user roles (for switch access); MIBs (MIB-II, Etherstats, wireless switch specific monitoring and configuration); Email notifications for critical alarms\*; Wireless Client friendly nomenclatures naming capability



Part number: SS-RFS6000. Printed in USA 04/15. ©2015 ZIH Corp. ZEBRA, the Zebra head graphic and Zebra Technologies logo are trademarks of ZIH Corp, registered in many jurisdictions worldwide. SYMBOL is a trademark owned by Symbol Technologies, Inc., which is an indirect wholly owned subsidiary of Zebra Technologies Corporation. All rights reserved. All other trademarks are the property of their respective owners. Specifications are subject to change without notice. R3-29-120

---

**ZEBRA TECHNOLOGIES**